4-2005

# *Parhadjelia cairinae* n. sp. (Nematoda: Habronematoidea: Habronematidae) in the Muscovy Duck, *Cairina moschata* (Linnaeus, 1758) (Aves: Anseriformes: Anatidae), from the Área de Conservación Guanacaste, Costa Rica

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J. Parasitol., 91(2), 2005, pp. 438–440


# *PARHADJELIA CAIRINAE* N. SP. (NEMATODA: HABRONEMATOIDEA: HABRONEMATIDAE) IN THE MUSCOVY DUCK, *CAIRINA MOSCHATA* (LINNAEUS, 1758) (AVES: ANSERIFORMES: ANATIDAE), FROM THE AREA DE CONSERVACION GUANACASTE, COSTA RICA

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ABSTRACT: A new species of *Parahadjelia* occurs in the muscovy duck, *Cairina moschata* (Linnaeus, 1758), from the Area de Conservacion Guanacaste, Costa Rica. The new species differs from *Parhadjelia neglecta* Lent and Freitas, 1939, in the body size, in the spicules shape and ratio of spicules, and in having 2 pairs of sessile papillae near the tail tip of the male. The characters exhibited by *P. neglecta* and the new species validate its generic status distinct from *Hadjelia*.

Habronematid nematodes have been reported living under the lining of the gizzard of avian hosts throughout the world. Previously, we reported 6 species representing 3 habronematid genera (*Procyrnea* Chabaud, 1958; *Excisa* Gendre, 1928; *Torquatoides* Williams, 1929) inhabiting avian hosts from the Area de Conservacion Guanacaste (ACG), Costa Rica (Zhang and Brooks, 2004; Zhang et al., 2004). On 20 May 2003, as part of an ongoing biodiversity inventory of the eukaryotic parasites of vertebrates inhabiting the ACG in northwestern Costa Rica (http://brooksweb.zoo.utoronto.ca/index.html), we collected specimens of a previously undescribed species of the rarely reported and unusual *Parhadjelia* Lent and Freitas, 1939.

## MATERIALS AND METHODS

The host, a muscovy duck, *Cairina moschata* (Linnaeus, 1758), was collected on 20 May 2003 and examined for parasites. Nematodes collected from beneath the lining of the gizzard were fixed in glacial acetic acid and preserved and stored in 70% ethanol. They were later cleared in lactophenol for further examination. Drawings were made with microscopy tube. Measurements (minimum, maximum, with mean in parentheses) were given in micrometers (μm) unless otherwise stated. TBL = total body length.

## DESCRIPTION

### Parhadjelia cairinae n. sp.

(Figs. 1–9)

*Diagnosis:* Body elongated, slender and medium size with fine transverse striations. Lateral alae absent. Oral opening dorsoventrally elongated and laterally compressed and dumbbell-shaped. Lateral pseudolabia well developed, each pseudolabium bearing cuticular thickened edges on anterior and posterior borders. Two papillae on anterior end and 1 amphid on posterior end of each pseudolabium. Dorsal and ventral labia deeply notched in median line, with 2 labial papillae and 2 large cephalic papillae located on each median labium. Two internal processes extending dorsally and ventrally from median line of dorsal and ventral labia respectively, each consisting of 2 sword-shaped structures (Fig. 1). Two triangular wings located on dorsal and ventral sides of each pseudolabium. Buccal capsule short and cylindrical. Esophagus clearly divided into short anterior muscular part and long posterior glandular part. Muscular esophagus 5.1% TBL in male and 3.7–5.0% (4.2%) TBL in female; glandular esophagus 36.8% TBL in males and 24.5–28.4% (26.4%) TBL in females. Nerve ring located at anterior part of muscular esophagus. Cervical papillae and excretory pore immediately posterior to nerve ring.

*Male (n = 1):* Body length 4.64 mm. Maximum width 143. Buccal capsule 26 long. Muscular esophagus 238 long and 22 wide; glandular esophagus 1,700 long and 51 wide. Nerve ring 200 from anterior end; excretory pore 254 from anterior end; cervical papillae 222 from anterior end. Posterior end of body curved. Caudal alae well developed and asymmetrical, 269 long; left ala 54 wide, right ala 38 wide. Tail rounded, 109 long. Tail with 4 pairs of preanal pedunculate papillae, 2 pairs of postanal pedunculate papillae, 2 pairs of small sessile papillae near tail tip. Spicules unequal and similar-shaped, with rounded proximal and pointed distal ends. Left spicule 1,130 long, right spicule 238 long. Ratio of right:left spicules 1:4.7. Gubernaculum absent.

*Female (n = 5):* Body length 5.93–7.16 mm (6.61 mm). Maximum width 159–190 (170). Buccal capsule 31–37 (34) long. Muscular esophagus 254–317 (275) long, and 25–32 (28) wide; glandular esophagus 1,450–2,030 (1,750) long, and 57–70 (64) wide. Nerve ring 190–216 (205) from anterior end; excretory pore 247–276 (260) from anterior end; cervical papillae 222–250 (236) from anterior end. Vulva located near anterior third of body, 2.12–2.64 mm (2.35 mm), or 32.7–36.9% (35.6%) TBL, from anterior end. Tail long and rounded, 193–225 (216) long. Eggs ellipsoid, thick-shelled, embryonated, 35–43 (40) long, 19–22 (21) wide.

### Taxonomic summary

*Type host: Cairina moschata* (Linnaeus, 1758) (Aves: Anseriformes: Anatidae).

*Type locality:* Cafetal, Sector Santa Rosa, Area de Conservacion Guanacaste, Guanacaste Province, Costa Rica, 10°50′44″N, 85°36′26″W.

*Site of infection:* Under the lining of the gizzard.

*Prevalence:* 1/1.

*Intensity:* One male and 5 females in 1 host.

*Type specimens:* Holotype: USNPC 95652 (male); Allotype: USNPC 95653 (female); Paratype: USNPC 95654 (4 females).

*Etymology:* The new species is named after its host genus.

Received 30 October 2003; revised 2 August 2004; accepted 2 August 2004.

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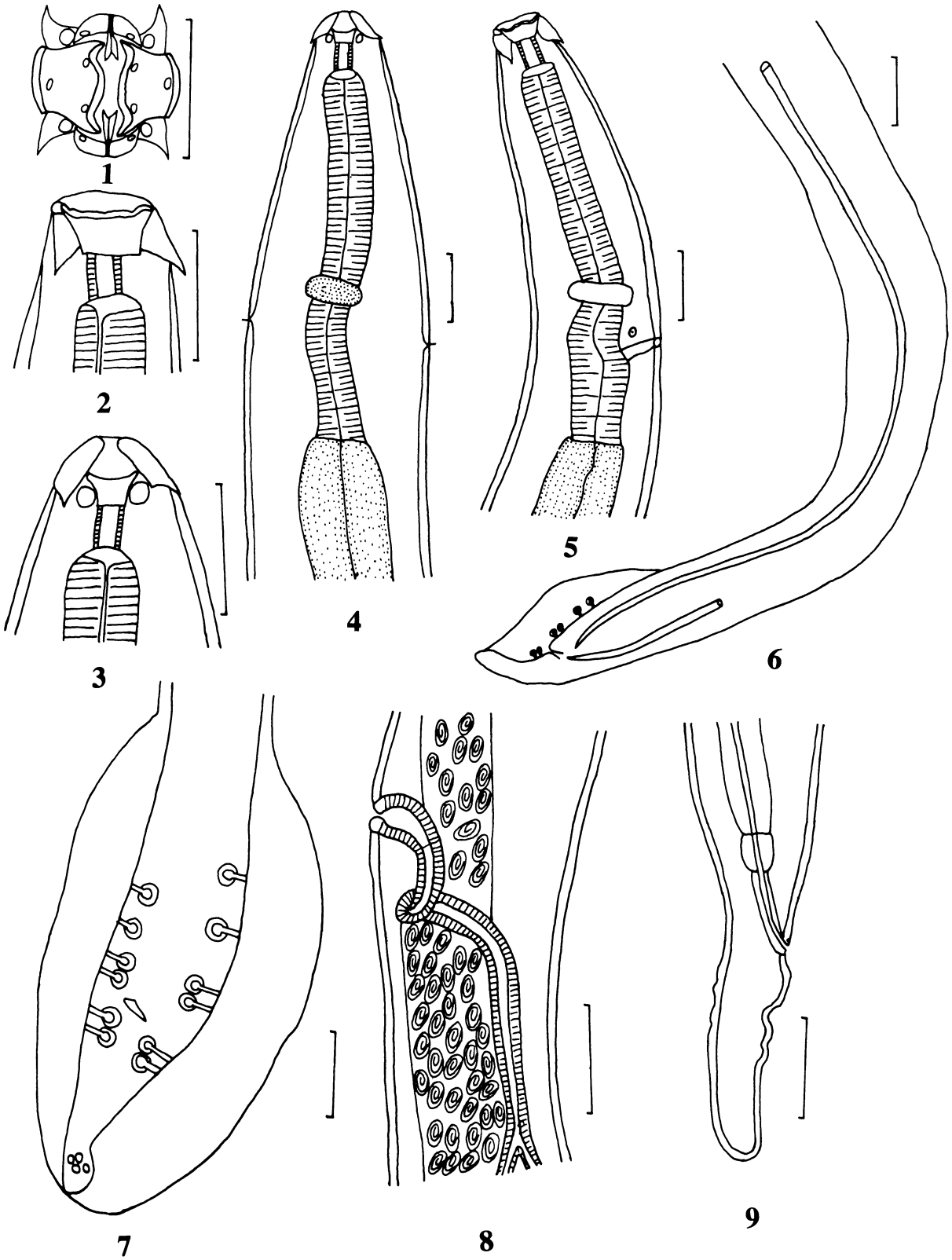


FIGURES 1–9. *Wonginema cairinae* n. sp. **1.** Anterior extremity of female, enface view. **2.** Anterior end of allotype female, lateral view. **3.** Anterior end of allotype female, ventral view. **4.** Anterior part of allotype female, ventral view. **5.** Anterior end of allotype female, lateral view. **6.** Posterior end of holotype male, lateral view. **7.** Holotype male tail, ventral view. **8.** Vulvar region of allotype female. **9.** Posterior end of allotype female, lateral view. **1–5, 7**. Bars = 50 μm; **6, 8, 9.** Bars = 100 μm.

### Remarks

Lent and Freitas (1939) proposed *Parhadjelia* for a habronematid, *P. neglecta*, collected in a domestic duck, *Anas boschas domestica* Linnaeus, from Brazil, which differed from species of *Hadjelia* in lacking blades on the posterior ends of the pseudolabia, in having 2 lateral wings on each pseudolabium, and in having internal processes. Despite these reported differences, Chabaud (1958/1959) synonymized *Parahadljelia* with *Hadjelia*. Subsequently, Yamaguti (1961) considered *Parhadjelia* a valid genus, whereas Skrjabin and Sobolev (1963) accepted Chabaud's synonymy, which Chabaud (1975) later repeated. Having discovered a second species of habronematid living under the lining of the gizzard of an anatid and exhibiting the same oral morphology as *P. neglecta*, however, we consider *Parhadjelia* a valid genus.

The new species differs from *P. neglecta* qualitatively by having similar rather than dissimilar spicules and 2 pairs of sessile papillae near the tail tip of male rather than none, having shorter bodies (male 4.64 mm, females 5.93–7.16 mm in *P. cairinae* vs. males 6.97–9.20 mm, females 11.97–14.99 mm in *P. neglecta*), and a spicule ratio of 1:4.7 vs. 1:6.14–6.62.

## DISCUSSION

Both species of *Parahadjelia* are now known to inhabit anatid birds in the Neotropics. We presume, therefore, that *P. neglecta* also occurs in nondomestic anatids in Brazil. Discoveries of species such as *P. cairinae* highlight our essential ignorance of parasite diversity, despite nearly 2 centuries of taxonomic endeavor. This underscores the need to support ongoing inventories of parasite biodiversity, not only for expanding our understanding of the full scope of parasite diversity, but also for clarifying and correcting taxonomic decisions based on assumptions that the full range of diversity has been circumscribed.

## ACKNOWLEDGMENTS

We are grateful to the scientific and technical staff of the ACG for support of this study, in particular: Elda Araya, Roger Blanco, Carolina Cano, Maria Marta Chavarría, Felipe Chavarría, Roberto Espinoza, Dunia Garcia, Guillermo Jimenez, Elba Lopez, Sigifredo Marin, Alejandro Masis, Calixto Moraga, Fredy Quesada, and Petrona Rios. Thanks also to Dan Janzen and Winnie Hallwachs, scientific advisers to the ACG, for their support. Host specimens were collected by Douglas Causey and Jeremiah Trimble (Museum of Comparative Zoology, Harvard University) and Calixto Moraga (ACG) under the authority of CITES permits US9258251 and CR9123440, Costa Rica Ministero del Ambiente y Energia Licencia 203640283 and Resoluciones 215-2001-OFAU and 411-2001-OFAU, Harvard University IACUC protocol 21-09, and USDA APHIS Permit 47956 (form VS16-6A). Host necropsy and parasite collections were made by D.R.B., Douglas Causey, Elda Araya, Sara Brant, Marie Causey, Ben Hanelt, Calixto Moraga, and Petrona Rios. This study was funded by a research grant from the Natural Sciences and Engineering Research Council (NSERC) of Canada to D.R.B. and by a grant from the MCZ Putnam Expedition Fund to Douglas Causey.

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